

We claim:

1 ABS. 1. A door assembly comprising:
2 TOO
3 LONG
4 a frame assembly designed and adapted to define a
5 substantially unbroken sealing surface around substantially the
6 entire periphery of said frame assembly; and
7 a first door having a substantially continuous sealing
8 member mounted on said first door;
9 said sealing member being designed and adapted to
engage said sealing surface and thereby provide a substantially
continuous seal around said door when said door is closed.

10
11 2. A door assembly according to claim 1 wherein;
12 said door has a substantially continuous peripheral
13 surface;
14 said sealing member is mounted on said substantially
15 continuous surface; and
16 said door is designed and adapted to press said
17 sealing member against said substantially continuous sealing
18 surface when said door is closed.

19 3. A door assembly according to claim 1 wherein said
20 frame assembly comprises at least one frame member having an
21 outwardly extending rib that defines a portion of said
22 substantially continuous sealing surface.

23 4. A door assembly according to claim 1 wherein said
24 frame assembly comprises:
25 a generally U-shaped member having an open lower end
and an outwardly facing surface that comprises a major portion
of said substantially unbroken sealing surface; and

6 a threshold that bridges said open lower end of said
7 U-shaped member, said sill member having an outwardly facing
8 surface that completes said substantially continuous sealing
9 surface.

1 5. A door assembly according to claim 1 wherein said
2 frame assembly has notches, further comprising a second door and
3 a plurality of hinge assemblies supporting said second door,
4 said hinge assemblies comprising hinge leafs designed and
5 adapted to pivot into said notches as when said second door is
6 pivoted into a closed position, whereby a section of said hinge
7 assembly and a section of said notched surface are substantially
8 coplanar and define a portion of said substantially continuous
9 sealing surface. (c)

1 6. A door assembly according to claim 1, comprising a
2 plurality of hinge assemblies, wherein said frame assembly
3 comprises a notched surface designed and adapted to receive one
4 or more of said hinge assemblies when said first door is pivoted
5 into a closed position, whereby at least part of said hinge
6 assembly and a section of said notched surface adjacent to said
7 hinge assembly are substantially coplanar.

1 7. A door assembly according to claim 1, wherein said
2 frame assembly has one or more frame notches, further
3 comprising:

4 a second door and a plurality of hinge assemblies
5 supporting said first door and said second door, said hinge
6 assemblies comprising:

7 a stepped fixed hinge leaf, designed and adapted to be
8 mounted in said frame notch and having an outwardly facing edge
9 with one or more hinge leaf notches;

10 a first hinge leaf designed and adapted to support
11 said first door; and

12 a stepped, second hinge leaf designed and adapted to
13 support said second door and to pivot into said hinge leaf notch
14 when said second door is pivoted into a closed position, whereby
15 sections of said second hinge leaf, said fixed hinge leaf and
16 said frame are substantially coplanar and define a portion of
17 said substantially continuous sealing surface (1).

8. A door assembly according to claim 7 herein said door
assembly comprises a prime door and a screen door and said
second hinge assembly supports said screen door

9. A door frame assembly comprising:

a stepped, U-shaped frame member having:

a first, laterally facing section designed and
adapted to be mounted to a structure;

5 a second, outwardly facing section designed and
6 adapted to define a sealing surface; and

7 a stepped, square cut threshold having:

8 a outwardly facing section that is substantially
9 coplanar with said outwardly facing section of said frame
10 member; and

11 an outer section that extends outward from said
12 outwardly facing section and has an end that is square cut
13 with and substantially coplanar with an end of said
14 outwardly facing section, whereby there is a space between

15 the end of said outer section of the sill member and the
16 third section of said vertical member; and
17 a plug attached to at least one of said sill and said
18 frame, and closing said space.

1 10. A door according to claim 9 wherein said plug
2 comprises nylon.

1 11. A door assembly having at least one hinge assembly
2 mounted on a door frame, said hinge assembly comprising:

3 a mounting plate having an upper fixed knuckle and a
4 lower fixed knuckle, each of said knuckles having bores with a
5 common axis;

6 stepped bushings with first sections mounted in said
7 bores and second sections that are larger than said bores, said
8 bushings being inserted into said bores so that the larger
9 section of one bushing is above the upper knuckle and the larger
10 section of another bushing is above the lower knuckle;

11 a hinge leaf having a leaf knuckle that is positioned
12 between and has a bore that is substantially coaxial with the
13 bores of said upper fixed knuckle and said lower fixed knuckle;

14 a stepped leaf bushing having a first section mounted
15 in said leaf bore and a second section that is larger than said
16 leaf bore, said leaf bushing being inserted into said leaf bore
17 so that said second section of said leaf bushing is below said
18 leaf knuckle and is supported by the bushing mounted in the
19 lower knuckle; and

20 a metallic pin extending through said bushings,
21 whereby said hinge leaf can pivot with respect to said mounting

22 plate with minimal metal-to metal wear between said knuckles,
23 and between said pin and said knuckles.

1 12. A door assembly according to claim 11 wherein:
2 said bores comprise narrower orienting grooves and at
3 least one wider orienting groove with a bottom that is wider
4 than a bottom of said narrower orienting groove; and
5 the bodies of said bushings comprise narrower
6 orienting ribs designed to fit into said narrower orienting
7 grooves, and at least one wider orienting rib designed to fit
8 into said wider orienting groove.

13. A door assembly according to claim 12 wherein said
bores have at least two of said wider orienting grooves and the
bodies of said bushings have at least two of said wider
orienting ribs]

14. A door assembly according to claim 12 wherein said
heads of said bushings comprise contact surface on the opposite
side of the heads from the bodies of the bushings, and said
4 contact surfaces comprise at least two raised contact surfaces,
5 at least two depressed contact surfaces, each of said depressed
6 contact surfaces being between two of said steps, with inclined
7 surfaces between said steps and said valleys.

1 15. A door assembly according to claim 14 wherein said
2 steps are substantially flat and coplanar, and said valleys are
3 substantially flat, coplanar and parallel to said steps.

1 16. A door assembly to claim 15 wherein said inclined
2 surfaces have a substantially constant slope.

1 17. A door assembly according to claim 11 further
2 comprising at least one annular plug inserted into the opposite
3 end of one of said bores from the larger end of the bushing
4 inserted into said bore.

1 18. A door assembly according claim 17 wherein said
2 annular plugs are inserted into the opposite ends of all of
3 bores in the hinge knuckles of said assembly from, and said
4 metallic pin extends through all of said plugs and bushings.

1 19. A door assembly according to claim 11 wherein said
2 bushings comprise acetal plastic.

1 20. A door assembly comprising:
2 a door with a notched edge and a groove designed and
3 adapted to support a weather seal;
4 a hinge leaf in a notch in said edge, said leaf having
5 a groove designed and adapted to support a weather seal, said
6 leaf groove being aligned with the groove in said door; and
7 a weather seal extending through the groove in the
8 edge of the door and the groove in the hinge leaf.

1 21. A door assembly according to claim 20 wherein said
2 door comprises an edge member having an arm extending therefrom
3 and said groove comprises a slot with a cruciform cross-section
4 in said arm; and
5 said groove in said hinge leaf comprises a cruciform
6 slot.

1 22. A door assembly according to claim 21 wherein said
2 weatherseal comprises a cruciform section designed and adapted
3 to be mounted in said grooves, and a serpentine section
4 extending from said cruciform section.

1 23. A door assembly according to claim 22 wherein said
2 cruciform section of said weather seal comprises polypropylene
3 and said serpentine section comprises a thermoplastic elastomer,
4 and said polypropylene and said thermoplastic elastomer are co-
5 extruded to form said weather seal.

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1 24. A door assembly according to claim 22 further
2 comprising a noise reduction seal, said noise reduction seal
3 being attached to said first door and having a section that
4 extends into said serpentine section of said weatherseal.

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1 25. A door assembly comprising:
2 a frame assembly with a flange having a groove
3 extending along said flange, and a door pivotally attached to
4 said frame by a plurality of hinges, said hinges having at least
5 one leaf with a rib designed and adapted to pivot into said
6 groove as said door is closed.

1 26. A door assembly according to claim 25 wherein said
2 groove has an inwardly sloping side and said rib has an
3 outwardly sloping side that compliments said inwardly sloping
4 side.

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Abstract of the Disclosure

A door frame with a substantially continuous sealing surface supports a door with a substantially continuous sealing member mounted thereon. A second substantially continuous seal on a second door, such as a screen door, may seal against insects. A stepped U-shaped frame member has an opening at one end that is closed with a square-cut member, such as a threshold, leaving gaps at the outer steps of the frame. Plugs fill these gaps, providing a continuous surface without expensive machining of the threshold. Continuous sealing surfaces may be formed with interfitting frames and hinges. A rib with an outwardly facing surface that forms much of the sealing surface. The rib is notched to accept the fixed hinge leaf of a hinge assembly. The fixed hinge leaf is stepped to fit into a notch in the frame rib, and to provide a surface that is substantially coplanar with the outwardly facing surface of the rib. In turn, the fixed hinge leaf is notched to accept at least one pivoting hinge leaf, which is also stepped to provide a surface that is coplanar with the above-identified surfaces of the fixed hinge leaf and the frame rib, producing a substantially coplanar, outwardly-facing sealing surface.

One main frame assembly has a groove with an undercut or dovetail surface, and parts of a hinge assembly attached to this frame may have a rib with an outwardly sloping surface that complements and interlocks with the dovetail groove. Another interlocking system has a component, such as a door surround, with kerfs to support a sealing member and notches for other components, such as hinge leafs, which also have kerfs for the sealing member. The surround has a rib that fits into a grove on the hinge leaf, which ensures precise alignment of the kerfs,

facilitates installation of the sealing member and increases structural integrity.

One hinge assembly has a mounting plate fixed knuckles spaced having to receive knuckles of pivoting hinge leaves. 5 Stepped bushings are inserted into the top end of the fixed hinge bushings, and into the bottom end of the knuckles of the pivoting hinge leafs. The bushings in the pivoting leafs, which support the door or doors, bear on bushings in fixed knuckles.

10 The bores and bushings are preferably designed, e.g. with matching grooves and ribs, so that the bushings must be properly oriented to fit into the bores. In one embodiment, the heads of the bushings have at least two steps or raised contact surfaces and at least two indentations or depressed contact surfaces. When the doors are opened, the steps on their bushings in the pivoting hinge leaves drop into the indentations in the adjacent fixed hinge leaf and hold the door in position.

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